DOCUMENT RESUME

ED 204 383 TM 810 373

AUTHOR Outerbridge, Alice N.
TITLE A Survey of Test Validation Study Costs.
INSTITUTION Office of Personnel Management, Washington, D.C.
REPORT NO OPM-TM-79-18
PUB DATE Aug 79
NOTE 16p.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cost Estimates; *Program Costs; *Program Validation; *Research Projects; *Surveys
IDENTIFIERS *Content Validity; *Criterion Related Validity

ABSTRACT

Information is provided on total costs, cost elements, and other related background aspects of validation research. Cost elements covered were staff time (broken into researcher and clerical, subject matter expert, and research participant), overhead, travel, and miscellaneous costs. Information is reported for 21 studies or groups of studies. In round figures, costs ranged from $24,000 to $673,000 for criterion-related studies and from $8,000 to $1,245,000 for content validity studies. Information was gathered by telephone or personal contact with principal researchers or other persons having a detailed knowledge of recent validation studies. Because many persons were reluctant to mention individually identifiable cost figures, all studies are described in general terms and the accuracy of the information is unknown. (Author/RL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Personnel
Research and
Development
Center

Technical Memorandum 79-18

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

ED204383

A Survey of Test Validation Study Costs

TM 810 373

U.S. Office of Personnel Management
Staffing Services Group

2

TM-79-18

A SURVEY OF TEST VALIDATION STUDY COSTS

Alice N. Outerbridge

Office of Personnel Management
Personnel Research and Development Center
Research Section
Washington, D.C.
August 1979

A SURVEY OF TEST VALIDATION STUDY COSTS

ABSTRACT

This survey provides information on total costs, cost elements, and other related background aspects of validation research. Cost elements covered were staff time (broken into researcher and clerical, subject matter expert, and research participant), overhead, travel, and miscellaneous costs. Information is reported for 21 studies or groups of studies. In round figures, costs ranged from $24,000 to $673,000 for criterion-related studies and from $8,000 to $1,245,000 for content validity studies. The sources of information were in most cases the recollections or records of persons having knowledge of each study. The accuracy of the information is unknown.

A SURVEY OF TEST VALIDATION STUDY COSTS

This survey of the costs of conducting test validation research showed a wide range of expenditures. The rounded costs for individual criterion-related studies ranged from $24,000 to $673,000. The costs of content validity studies ranged from $8,000 to $1,245,000. The work done varied widely in scope, complexity, and cost elements covered. The intent of the survey was to provide information on several cost elements and cost-related aspects of research. Records of the types of detailed cost figures surveyed are not routinely kept by research personnel. The sources of information for the survey were, in most cases, the recollections and records of persons having knowledge of each study. Several respondents stated that their recollections were only "ballpark" estimates subject to considerable error. In two cases financial information was available, and in another a written cost report was prepared by a principal researcher.

The Scope of the Survey

The basis of the survey was a 1975 report of total costs for 30 validation studies done in the public sector that was compiled for the Equal Employment Opportunity Coordinating Council (United States Civil Service Commission, Note 1). The principal researchers or other knowledgeable persons of 17 of those studies furnished cost data. In addition, data was obtained from eight studies that were known to the author or discovered through referrals from persons having knowledge of ongoing validity research, or found by contacting organizations involved in test validation. For some studies costs were available in terms of the cost of a larger group. These studies were treated as a group in the survey.

In general, the studies covered represent work in several research situations, or combinations of situations, carried out by or for state jurisdictions or military or civilian sectors of the Federal government. Seven studies were conducted by consultants drawn from universities or private firms. At least six projects were funded by Federal grants. At least two studies were intended as pilot projects or training experiences. Four were components of a larger construct validity design. At least one was conducted in an atmosphere of litigation. Six were examples of cooperative research involving more than one jurisdiction or organization.

With respect to research strategies, both content and criterion-related studies were covered. Criterion-related studies included both predictive and concurrent designs. The cost of construct validation was not specifically addressed by this survey. Four of the criterion-related studies covered were, however, conducted in support of the construct validity of one written test. The total cost

---

The information contained in this survey was gathered by telephone or personal contact with principal researchers or other persons having a detailed knowledge of recent validation studies. Because many persons were reluctant to mention individually identifiable cost figures, all studies have been described in general terms. Although the names of persons surveyed have been kept anonymous, the cooperation and gracious assistance of these persons is gratefully acknowledged.

of these studies (see tables 1 and 2, entries 11, 12, 13 and 14) was $687,000 rounded to the nearest thousand. The scope of this survey does not cover a representative sample nor does it contain a compilation of typical or average study costs. Studies were selected on the basis of the availability of cost figures.

The survey addressed four elements of research activity: the validity paradigm, job analysis, predictor development, and criterion development. Six cost elements were covered: researcher and clerical time, subject-matter-expert time, research participant time, overhead, travel, and miscellaneous costs such as printing, data processing, and auxilliary consultant costs. In some cases researchers were unwilling or unable to calculate more than overall figures for their costs. No judgments were made concerning the technical adequacy or potential utility of any study.

Source of Information

For each study, a principal researcher or project manager was interviewed, either by telephone or by personal contact. In two cases, referral was made to a grants manager who had knowledge of both financial and background aspects of the project.

Each contact person was interviewed to obtain background information concerning (a) the starting and ending dates of the study, (b) the validity paradigm used, (c) whether the work included job analysis, (d) if a predictor had been developed, (e) whether criteria had been developed, and (f) the final number of research participants in the study. Persons were also asked if they had access to or could construct cost figures for the cost elements addressed by the survey. Finally, each person was asked if he or she had knowledge of other studies for which cost figures might be available. It was agreed that all figures were to be kept anonymous. Because of the agreed-upon anonymity, data sources were not referenced. Nevertheless, some persons contacted were reluctant to reveal cost figures. In addition, one study for which cost figures were available was omitted at the request of the principal researcher, who considered the costs to be atypical, because of the complexity and pioneering nature of the research. The total cost of this research was in the mid-range of the studies analyzed here. For ten studies a technical report or other written documentation was available.

The Costs Determined and Their Accuracy

For all studies, the largest single cost element was researcher and clerical time. Inconsistent interpretation of this cost element affected its magnitude in individual studies. In some cases, it was interpreted as the total amount of researcher and clerical time budgeted to the study. In other cases it was interpreted as the amount of time specifically spent on research duties only and did not include time spent on any related duties. In many instances, interpretation of this cost element was unclear.

Subject-matter-expert time was defined as the cost of persons from the studied occupation participating in the research project other than as research subjects. Interpretation of this cost element was inconsistent, and judgment was necessary to separate subject-matter-expert time from researcher and clerical time. In two studies, researcher and clerical time included both consultant costs and costs of personnel from the organization engaging the consultant. In other cases, organizational personnel costs were included as subject-matter-expert costs by the source person. Here the decision was that such persons were functioning primarily as advisors on subject matter rather than as managers or cooperative researchers in the study.

Research participant time was the second largest cost element, although this element and subject-matter-expert time are ones generally omitted from total figures because they are not costs directly incurred by researchers. They are, however, costs borne by the organization conducting or contracting for the research. Participating employees must be released from their regularly assigned duties. When participating employees are reassigned, their regular duties must be carried out by others or remain undone. Resulting morale problems, failures to meet deadlines, work slowdowns, and other such problems may all contribute to the actual costs of research appropriation of employees. Therefore estimates of the cost of research-participant and subject-matter-expert time based on salary or salary plus overhead may be low.

Overhead was another relatively large cost element. In some of the studies reported, the inclusion of overhead or its amount was unclear. Overhead was defined to cover a variety of cost factors, ranging from fringe benefits only to estimates covering building space, heating, and other such physical necessities. Overhead was reported to be as much as 100 percent of staff time costs.

Table 1 shows the background information collected on each study. Table 2 shows costs of each study broken down into cost elements. Notes for each table are appended.

Discussion and Conclusion

The complexity of the research strategy and the number and kinds of predictors used definitely affected the amount of staff time required to carry out each piece of research. In comparing costs among studies it should be noted that several other factors may influence research costs. The existence of job analysis, its complexity, and the development of multiple criterion instruments also affect costs, as does the amount of work required to develop and refine a predictor instrument. Clearly the number and salary level of research participants and subject matter experts are significant cost factors. Other aspects of the research process may also exert an influence. The anticipation or the presence of litigation and the presence of the *Uniform Guidelines on Employee Selection* (USEEOC, USCSC, USDOL, & USDOJ, 1978) would result in more attention to extensive documentation and to efforts to control for such variables as race, sex, and ethnic group, and would therefore increase costs. Studies carried out by several cooperating organizations and those using a research project as a training device would also involve more expenditures.

Because itemized cost figures are not routinely kept by researchers, data were, for the most part, drawn from recollections and records of research personnel and were in some cases no more than rough estimates. When a particular piece of research had been supported by a Federal grant, budget documents were often available, but may have at times underestimated actual research costs. The obtained figures do, however, represent some possible cost figures and do clearly demonstrate the wide range of costs possible in conducting validation research. Such figures could be helpful to someone planning a research project.

Ideally, a standard reporting format would include a number of defined cost elements. I would recommend the following list:

I. Staff Time Costs

A. Research team leader
B. Research team members: all nonclerical project personnel other than the team leader who are primarily concerned with scientific aspects of the work
C. Clerical personnel
D. Administrative personnel: when research is done primarily by a consultant this element is the

TABLE 1

Background Information for the Studies Surveyed

	Study	Type	Date	Job Analysis	Development of Predictor	Development of Criterion	N
1.	Police Exam A	Criterion-related (predictive)	1976-1978	No	Yes	Yes	300
2.	Police Exam B	Content & Criterion-related	1976-1979	Yes	Yes	Yes	300
3.	Police Exam C	Criterion-related (concurrent)	1972	Yes	No	Yes	275
4.	Police Exam D	Criterion-related	1974-1978	Yes	Yes	Yes	1,700
5.	Police Exam E	Criterion-related	1972-1973	Yes	No	Yes	802
6.	Firefighter Exam A	Content & Criterion-related	1975-1979	Yes	Yes	Yes	214
7.	Firefighter Exam B	Criterion-related (concurrent)	1972	Yes	No	Yes	328
8.	Firefighter Exam C	Criterion-related	1976	Yes	Yes	Yes	264
9.	Transit Operator [a]		1968-1979	Yes	Yes	Yes	1,471+
10.	Group of 3 studies: Medical Technician, Inventory Manager, Cartographic Technician	Criterion-related	1968-1973	Yes	No	Yes	1,400
11.	Customs Inspector	Criterion-related	1975-1977	Yes	No	Yes	190
12.	Social Insurance Claims Authorizer Study A	Criterion-related	1974-1975	Yes	No	Yes	253
13.	Social Insurance Claims Authorizer Study B	Criterion-related	1975-1977	No	No	No	175

TABLE 1 (Continued)

	Study	Type	Date	Job Analysis	Development of Predictor	Development of Criterion	N
14.	Internal Revenue Officer Study B	Criterion-related	1975-1977	Yes	No	Yes	305
15.	Average study cost(based on 5 studies done in one jurisdiction)	Criterion-related	1975-1978	Yes	Yes	Yes	75-300
16.	Group of 6 studies conducted in one jurisdiction	Criterion-related	1973	No	Yes	Yes	40-107
17.	40 military occupations	Criterion-related (predictive)	1976-1978	No	No	No	5,000
18.	Military technical training success	Criterion-related	1977	No	No	No	43,985
19.	46 Public Service Occupations	Content	1972-1974	Yes	Yes	Not applic.	Unavailable
20.	State Police	Content	1975	Yes	Yes	Not applic.	Unavailable
21.	Clerical exam Multi-jurisdictional study	Content	1973-1976	Yes	Yes	Not applic.	300-400

Note. Appendix 1 contains notes to entries in Table 1.

[a] This study had three parts: a concurrent study having an *N* of 1113 males, a predictive study having an *N* of 358 males, and a differential study of females for which the *N* was unavailable.

TABLE 2

Dollar Cost of Studies Surveyed, by Cost Element

Study	Staff Time			Other			
	Researcher and clerical	Subject matter expert	Research participant	Overhead	Travel	Miscellaneous	Total
1. Police Exam A	51,500	3,000	30,380	12,852		800	98,532
2. Police Exam B	150,000	34,880	27,150	18,609			230,639
3. Police Exam C	30,000	10,000	16,500		5,000		61,500
4. Police Exam D	132,877		127,500	85,964	58,620	55,698	460,659
5. Police Exam E							70,000
6. Firefighter Exam A	265,345	14,057	33,884	5,355	none	5,962	334,603
7. Firefighter Exam B	30,000	10,000	19,700		5,000		64,700
8. Firefighter Exam C	125,000	15,000	10,085				150,085
9. Transit Operator	295,514		84,159	199,003	62,295	26,050	667,021
10. Group of 3 Studies: Medical Technician; Inventory Manager; Cartographic Technician	592,300	9,536	200,256		61,200		802,092[a]
11. Customs Inspector	167,813	57,184	31,803		10,181	11,900	278,881
12. Social Insurance Claims Authorizer Study A	150,772	5,089	29,008		5,014	13,405	203,288
13. Social Insurance Claims Authorizer Study B	35,028	2,067	10,430		100	5,179	52,084
14. Internal Revenue Officer	80,898	19,228	32,542		7,432	11,900	152,000

TABLE 2 (Continued)

Study	Staff Time			Other			
	Researcher and clerical	Subject matter expert	Research participant	Overhead	Travel	Miscellaneous	Total
15. Avg. study cost(based on 5 studies done in one jurisdiction)	33,500	None	3,100		200	3,860	40,660
16. Group of 6 studies conducted in one jurisdiction	120,000		13,000		80	12,000	145,080[b]
17. 40 military occupations	50,000	None			None		50,000
18. Military technical training success	666,302			6,525			672,827
19. 46 public service occupations	152,846	152,846		56,989		1,358	364,039[c]
20. State Police							1,245,000[d]
21. Clerical Exam multi-jurisdictional study							105,000[d]

Note. Appendix 2 contains notes to entries in Table 2. Blank spaces indicate that information on the cost element was unavailable.

[a] The average cost of one study was approximately $267,833.

[b] The average cost of one study was approximately $24,180.

[c] The average cost per occupation was $7,913.

[d] Only a total cost figure was available; information on separate cost elements could not be obtained.

cost of personnel contracting for and managing the work. In cooperative studies it would be the cost of personnel who primarily attend to administrative rather than scientific aspects of the work

E. Research participants: persons from the occupation under study to whom research instruments had been administered, or supervisors who supply performance appraisals

F. Subject matter experts: persons from the occupation under study who supply advice on subject matter or give administrative support

II. Travel

III. Overhead: space and utilities costs, fringe benefits, office equipment and supplies

IV. ADP costs: computer processing and the time of programmers and other ADP personnel

V. Miscellaneous consultant costs: costs for a consultant when only a small segment of the scientific or technical aspects of the work is done under contract

VI. Miscellaneous costs such as printing, mailing, or forms design

Systematic collection of such data would be useful to researchers in many instances. Such figures would provide the researcher with a solid basis for making budgetary decisions. Under the *Uniform Guidelines on Employee Selection,* (USEEOC et al., 1978) users of selection procedures will be required to prepare extensive and often costly documentation. Systematic compilation of research costs would indicate areas where costs could feasibly be reduced.

A researcher might keep such figures on a monthly basis, and, at the end of a year, be better able to analyze his or her work. For instance, the cost of research participant time could be investigated in terms of statistical power needed and the cost per participant. Information gained could also be used to assess the utility of the research product and to compare the cost effectiveness of different approaches to selection. For example, selection by computerized tailored testing could be compared to selection by a standard, content valid paper-and-pencil test.

To go a step further, if costs were compiled in a standardized fashion, figures from a number of studies could be pooled to yield average cost figures for similar types of research. If such standardized data were centrally grouped according to similarity of research design, representative cost element figures for groups of similar studies could be prepared. These figures could be stored and updated by means of ADP and would provide information useful to persons administering and planning new research or to persons managing or applying for research grants.

REFERENCE NOTE

1. United States Civil Service Commission. *Some typical costs for validation studies done in the public sector* (management report). Washington, D.C.: Personnel Research and Development Center, U.S. Civil Service Commission, June 1975.

REFERENCE

U. S. Equal Employment Opportunity Commission, U. S. Civil Service Commission, U. S. Department of Labor, & U. S. Department of Justice. Uniform guidelines on employee selection procedures. *Federal Register* , 1978, 43, (166), 38295-38309.

APPENDIX A

Notes to Entries in Table 1

1. Multiple predictors were used, some developed as part of the research. Criteria were training success, work simulation and field ratings. Information source: records and recollection of project director.

2. Research conducted by a consultant. Information source: recollections of consultant and police department project manager.

3. Research conducted by a consultant. Study was done for and managed by a multi-jurisdictional consortium. Information source: recollection and records of project manager and project personnel.

4. Study was conducted by a university research group and involved ten cooperating police agencies. An eight-test battery was developed for use as the predictor. Information source: grant records.

5. Criterion was a set of ratings. Information source: recollection of project director.

6. Joint study conducted by civil service commission and fire department. Information Information source: Cost analysis provided by project director.

7. Research conducted by a consultant. Study was done for and managed by a multi-jurisdictional consortium. Information source: records and recollection of project director.

8. Research conducted by a consultant. Information source: recollection of consultant and fire department project manager.

9. Three part study: (1) concurrent study using white, black and Spanish-speaking male transit operators; (2) predictive study using white, black, and Spanish-speaking male applicants who were subsequently hired; and (3) study using female transit operators. Studies were conducted by a hired consultant and managed by one transit company with cooperation from several other companies. *N* for the female transit operator study was not available. Information source: grant records; recollection of grant manager; technical report.

10. Co-operative study conducted by Federal government and an outside research organization. Information source: recollection of principal investigator and technical report.

11. One of a series of four studies done in support of the construct validity of one examination. Information source: recollection and records of project members; technical report.

12. One of a series of four studies done in support of the construct validity of one examination. Information source: technical report of project costs.

13. One of a series of four studies done in support of the construct validity of one examination. Criterion was success in training. Information source: recollection and records of principal investigator.

14. One of a series of four studies done in support of the construct validity of one examination. Information source: records and recollection of principal investigator; technical report.

15. *N*'s for individual studies ranged from 75 to 300. Four studies followed a concurrent design; one followed a predictive design. Three studies were conducted in the period from 1975 to 1976, one was conducted in 1977, and one in 1978. Information source: recollection and records of project manager.

16. Studies were completed in 1973. A consultant was employed to review the six studies. Information source: recollection of project manager.

17. All data were obtained from records. Therefore, data collection was not included in costs for this study. Criterion data, performance in advanced training, were available but needed some modification. Administration of predictor was done by test administration personnel as a regular part of their job, and not by researchers. This work was not considered as part of the study. *N*'s ranged from 35 to 1,000 for any individual occupation. Information source: principal investigator.

18. Data shown in Table 1 are that of the research report. Forty-three occupational clusters were covered by the study. *N*'s ranged from 103 to 5,736 for individual job areas studied. All data used were available in recorded form. For the purpose of this cost survey the research organization made an estimate of the cost of criterion development and data collection and of the cost of predictor data collection. Information source: budget records, records and recollection of principal investigator, technical report.

19. Information source: records and recollection of project manager.

20. Study produced a two-part content-valid examination including both a written test and a physical performance examination. Information source: records and recollection of principal investigator.

21. Information source: recollection of project manager.

APPENDIX B

Notes to Entries in Table 2

1. Overhead included only fringe benefits, estimated at 15% of the study's total cost. Research participant time included time of research subjects and supervisory raters.

2. Researcher and clerical time costs are consultant's total costs and include overhead plus a small amount of travel. Subject-matter-expert and research participant costs include fringe benefits estimated at 30% of salary rates.

3. Researcher and clerical time includes $20,000 in consultant costs plus $10,000 for time of consortium personnel. Overhead was included in estimation cost figures, but its specific amount is unknown.

4. Research participant costs were those of reimbursing police departments at the rate of $75.00 per officer for research subjects.

5. Only an estimate of total costs was available. Total does not include subject-matter-expert or research participant time.

6. Researcher and clerical time includes 8% benefits and 14% overhead for salaries of civil service commission personnel and costs without benefits or overhead for fire department personnel. Subject-matter-expert and research participant costs do not include overhead or benefits.

7. Researcher and clerical time includes $20,000 in total consultant costs and includes overhead. Research participant time includes that of both research subjects and supervisory raters, and does not include overhead. Whether overhead is included in subject-matter-expert costs is unknown.

8. Researcher and clerical time costs are total consultant costs and include overhead. Research participant time includes that of both research subjects and supervisory raters, and does not include overhead. The inclusion of overhead in subject-matter-expert costs is unknown.

9. Researcher and clerical time included clerical time from the managing transit authority and managerial, technical, and professional time from all participating transit companies. Overhead included consultant overhead at 72% of consultant costs and fringe benefits for transit company employees including research participants.

10. Subject-matter-expert and research participant costs were estimated by the author from *N*'s and time spent, using $24,800 as the average cost of a staff year including overhead, a figure used in the Personnel Research and Development Center for budget estimations. Travel was estimated by the author from the number of trips, duration of each trip, and the number of staff members travelling. Estimated costs of $25 per diem and $200 per carrier fare were used.

11. Entries 11, 12, 13, and 14 were part of a series of studies done in support of the construct validity of one examination, with cost totalling $686,973. Researcher and clerical time, subject-matter-expert, and research participant costs were estimated using $24,800 as the average cost of a staff year including overhead.

12. See note 11.

13. See note 11.

14. See note 11.

15. Overhead was included in staff-time costs, but its amount is unknown.

16. Overhead was not included in figures.

17. Total amount based on a cost of $60,000 per staff year including overhead. Because research participants were applicants for employment their cost was not available although potentially large (5,000 applicants at 3 hours each). Computer-time costs although possibly large were not available.

18. Study used automated records as its data source. Researcher and clerical time costs for data analysis include 100% overhead. Predictor collection costs were estimated at $5 per case and criterion development costs at $10 per case. Specific amounts for subject matter experts, research participants, data collection, overhead, travel, and and miscellaneous were unavailable.

19. Researcher and clerical staff time costs include fringe benefits. The study involved some research participant time but this was not available, nor was the cost of printing. Miscellaneous costs include only a fee for work done by an outside consultant.

20. Total costs include all operational costs as well as research and development expenditures. Individual cost element figures were not available. The total includes costs for: consultant fees, salaries and per diem for examination development team, statewide recruitment team, processing 30,500 applications, test printing and performance test construction, training sessions for the administration of the two-part examination, developmental work on background investigation and oral examination, and test scoring and production of eligibility test.

21. Only an estimate of total costs was available.

* U. S. GOVERNMENT PRINTING OFFICE : 1979--620-003/3394